

WHAT IS CLAIMED IS:

1. A mobile communication system comprising:

transmission control means for providing a vacant period,  
in which no communication data is present, in one or more of  
5 communication frames, and inserting a first control signal for  
maintaining a communication quality in said vacant period.

2. A mobile communication system as set forth in claim 1,  
wherein said transmission control means inserts said first  
10 control signal at a predetermined time interval.

3. A mobile communication system as set forth in claim 2,  
wherein said time interval is set to be longer than a time  
interval of said first control signal in a communication mode  
15 where transmission data are present in said communication  
frame.

4. A mobile communication system as set forth in claim 1,  
wherein said transmission control means provides a vacant  
20 period from a timing immediately after a second control signal  
for maintaining communication quality.

5. A mobile communication system comprising:

transmission control means for providing a vacant period,  
25 in which no communication data is present, in one or more of

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communication frames from a timing immediately after a second control signal for maintaining communication quality.

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6. A mobile communication system as set forth in claim 1,  
5 wherein said transmission control means transmits a third control signal for maintaining communication quality immediately after end of said vacant period.

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7. A mobile communication system as set forth in claim 1,  
10 wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

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8. A mobile communication system as set forth in claim 5,  
15 wherein said second control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

9. A mobile communication system as set forth in claim 6,  
20 wherein said third control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

10. A mobile communication system as set forth in claim 1,  
25 wherein said first control signal includes a transmission power

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15. A mobile communication system as set forth in claim 6,  
wherein said third control signal includes a pilot signal to  
be used for demodulation of the communication data or a

transmission power control for a forward link and a transmission power control information for reverse link.

16. A mobile communication system comprising:

5 transmission control means for providing a vacant period in which no communication data is present, in one or more of communication frames, from a timing immediately after a second control signal for maintaining a communication quality, and transmitting a third control signal for maintaining the  
10 communication quality immediately after end of said vacant period,

each of said second and third control signals being a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

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17. A mobile communication system comprising:

transmission control means for providing a vacant period in which no communication data is present, in one or more of communication frames, from a timing immediately after a second  
20 control signal for maintaining a communication quality, and transmitting a third control signal for maintaining the communication quality immediately after end of said vacant period,

said second control signal being a transmission power  
25 control for a reverse link and third control signal being a

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pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

18. A mobile communication system as set forth in claim 1,  
5 wherein said vacant period is provided by compressing a transmission data in communication in a time link.

19. A mobile communication system as set forth in claim 1,  
wherein a communication mode is switched into a mode where said  
10 vacant period is provided at a predetermined time interval.

20. A mobile communication system as set forth in claim 1,  
wherein a communication mode is switched into a mode where said  
vacant period is provided by issuing a notice from said base  
15 station to said mobile station.

21. A mobile communication system as set forth in claim 1,  
wherein a communication mode is switched into a mode where said  
vacant period is provided by issuing a notice to said mobile  
20 station depending upon a link quality condition measured in said base station.

22. A mobile communication system as set forth in claim 1,  
wherein a communication mode is switched into a mode where said  
25 vacant period is provided by issuing a notice to said mobile

station depending upon a congestion condition measured in said base station.

23. A mobile communication system as set forth in claim 1,  
5 wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice from said mobile station to said base station.

24. A mobile communication system as set forth in claim 1,  
10 wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice to said base station depending upon a link quality condition measured in said mobile station.

15 25. A communication control method comprising:  
a step of providing a vacant period, in which no communication data is present, in one or more of communication frames, and  
a step of inserting a first control signal for  
20 maintaining a communication quality in said vacant period, for transmission.

26. A communication control method as set forth in claim 25,  
wherein said first control signal is inserted at a  
25 predetermined time interval.

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wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

5 32. A communication control method as set forth in claim 29, wherein said second control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

10 33. A communication control method as set forth in claim 30, wherein said third control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

15 34. A communication control method as set forth in claim 25, wherein said first control signal includes a transmission power control information for reverse link.

20 35. A communication control method as set forth in claim 29, wherein said second control signal includes a transmission power control information for reverse link.

25 36. A communication control method as set forth in claim 30, wherein said third control signal includes a transmission power control information for reverse link.

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in said third control signal included for demodulation of the communication power control for a communication power control information

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41. A communication control method comprising:

15       said second control signal being a transmission power  
control for a reverse link and third control signal being a  
pilot signal to be used for demodulation of the communication  
data or a transmission power control for a forward link.

43. A communication control method as set forth in claim 25, wherein a communication mode is switched into a mode where said vacant period is provided at a predetermined time interval.

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station depending upon a link quality condition measured in said mobile station.

49. A base station in a mobile communication system,  
5 comprising:

transmission control means for providing a vacant period, in which no communication data is present, in one or more of communication frames, and inserting a first control signal for maintaining a communication quality in said vacant period.

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50. A base station as set forth in claim 49, wherein said transmission control means inserts said first control signal at a predetermined time interval.

15 51. A base station as set forth in claim 50, wherein said  
time interval is set to be longer than a time interval of said  
first control signal.

52. A base station as set forth in claim 49, wherein said  
transmission control means provides a vacant period from a  
timing immediately after a second control signal for  
maintaining communication quality.

53. A base station in a mobile communication system,  
25 ~~comprising:~~

54. A base station as set forth in claim 49, wherein said transmission control means transmits a third control signal for maintaining communication quality immediately after end of said vacant period.

55. A base station as set forth in claim 49, wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

56. A base station as set forth in claim 53, wherein said second control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

57. A base station as set forth in claim 54, wherein said third control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

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61. A base station as set forth in claim 49, wherein said first control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link and a transmission power control information for reverse link.

25 63. A base station as set forth in claim 54, wherein said

third control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link and a transmission power control ~~information for reverse link.~~

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64. A base station in a mobile communication system, comprising:

transmission control means for providing a vacant period in which no communication data is present, in one or more of communication frames, from a timing immediately after a second control signal for maintaining a communication quality, and transmitting a third control signal for maintaining the communication quality immediately after end of said vacant period,

15 each of said second and third control signals being a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

65. A base station in a mobile communication system, comprising:

transmission control means for providing a vacant period in which no communication data is present, in one or more of communication frames, from a timing immediately after a second control signal for maintaining a communication quality, and transmitting a third control signal for maintaining the

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communication quality immediately after end of said vacant period,

said second control signal being a transmission power control for a reverse link and third control signal being a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

66. A base station as set forth in claim 49, wherein said vacant period is provided by compressing a transmission data in communication in a time direction.

67. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant period is provided at a predetermined time interval.

68. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice from said base station to said mobile station.

69. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice to said mobile station depending upon a link quality condition measured in said base station.



70. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice to said mobile station  
5 depending upon a congestion condition measured in said base station.

71. A base station as set forth in claim 49, wherein a communication mode is switched into a mode where said vacant  
10 period is provided by issuing a notice from said mobile station to said base station.

72. A mobile station in a mobile communication system, comprising:

15 quality measuring means for receiving a first control signal for maintaining a communication quality transmitted in a vacant period in which no communication data is present, in one or more of communication frames and measuring a reception quality on the basis of said first control signal; and

20 transmitting means for generating and transmitting a transmission power control information for a forward link according to said reception quality.

73. A mobile station in a mobile communication system,  
25 comprising:

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demodulation means for receiving a first control signal for maintaining a communication quality transmitted in a vacant period in which no communication data is present, in one or more of communication frames and demodulating a communication data using the first control signal.

74. A mobile station in a mobile communication system, comprising:

means for receiving a first control signal for maintaining a communication quality transmitted in a vacant period in which no communication data is present, in one or more of communication frames and controlling a transmission power in a reverse link according to said first control signal.

75. A mobile station in a mobile communication system, comprising:

quality measuring means for receiving a second control signal for maintaining a communication quality transmitted at a timing immediately before a vacant period in which no communication data is present, in one or more of communication frames and measuring a reception quality on the basis of said second control signal; and

transmitting means for generating and transmitting a transmission power control information for a forward link according to said reception quality.

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quality measuring means for receiving a second control signal for maintaining a communication quality transmitted at a timing immediately before a vacant period in which no communication data is present, in one or more of communication

frames and receiving a third control signal for maintaining the communication quality transmitted at a timing immediately after said vacant period, and measuring a reception quality on the basis of said third control signal;

5       transmitting means for generating and transmitting a transmission power control information for a forward link according to said reception quality; and

          means for controlling a transmission power in a reverse link on the basis of said second control signal.

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81. A mobile station in a mobile communication system, comprising:

          demodulation means for receiving a second control signal for maintaining a communication quality transmitted at a timing immediately before a vacant period in which no communication data is present, in one or more of communication frames and receiving a third control signal for maintaining the communication quality transmitted at a timing immediately after said vacant period, and demodulating a communication data using said third control signal; and

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          means for controlling a transmission power in a reverse link on the basis of said second control signal.

82. A mobile station in a mobile communication system, comprising:

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means for controlling a transmission power in a reverse  
15 link on the basis of said second control signal.

84. A mobile station as set forth in claim 75, wherein said second control signal includes a pilot signal to be used for demodulation of the communication data or a transmission power control for a forward link.

85. A mobile station as set forth in claim 78, wherein said  
third control signal includes a pilot signal to be used for  
demodulation of the communication data or a transmission power  
5 control for a forward link.

86. A mobile station as set forth in claim 72, wherein said  
first control signal includes a transmission power control  
information for reverse link.

87. A mobile station as set forth in claim 75, wherein said  
second control signal includes a transmission power control  
information for reverse link.

88. A mobile station as set forth in claim 72, wherein said  
first control signal includes a pilot signal to be used for  
demodulation of the communication data or a transmission power  
control for a forward link and a transmission power control  
information for reverse link.

89. A mobile station as set forth in claim 75, wherein said  
second control signal includes a pilot signal to be used for  
demodulation of the communication data or a transmission power  
control for a forward link and a transmission power control  
25 ~~information for reverse link.~~

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95. A mobile station as set forth in claim 72, wherein a communication mode is switched into a mode where said vacant period is provided by issuing a notice to said base station depending upon a link quality condition measured in said mobile station.

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